



**栅极驱动光耦**  
**Gate Drive**  
**Optocoupler**

**AT343**

**Product Data Sheet**

**AOTE DCC**  
**RELEASE**

**台湾奥特半导体科技有限公司**

TAIWAN AOTE SEMICONDUCTOR TECHNOLOGY CO.,LTD

[www.aotesemi.com](http://www.aotesemi.com)

## 概述 Description

AT343 包含一个砷化铝镓 LED，它被光学耦合到一个具有功率输出级的集成电路上。该光耦合器非常适合驱动电机控制逆变器应用中使用的功率 IGBT 和 MOSFET。输出级的高工作电压范围提供了栅极控制装置所需的驱动电压。该光电耦合器提供的电压和峰值输出电流使其非常适合直接驱动额定功率高达 1200V/200A 的 IGBT。

The AT343 contains an aluminum gallium arsenide LED that is optically coupled to an integrated circuit with a power output stage. The optical coupler is ideal for the power IGBT and MOSFET used in drive motor control inverter applications. The high operating voltage range of the output level provides the driving voltage required for the gate control device. The voltage and peak output current provided by the photocoupler make it ideal for directly driving an IGBT with a rated power of up to 1200V/ 200A.

## 特性 Features

- 最大峰值输出电流：4.0A  
Maximum peak output current: 4.0A
- 最小峰值输出电流：3.0A  
Minimum peak output current: 3.0A
- 轨道对轨道输出电压  
Track to track output voltage
- 最大传播延迟：200 ns  
Maximum transmission delay: 200 ns
- 最大传播延迟差：100 ns  
Maximum transmission delay difference: 100 ns
- 带迟滞的 LED 输入电流  
The LED input current with a hysteresis
- 符合加强绝缘标准  
Meet reinforced insulation standards

## 应用 Applications

- 开关电源  
Switching power supplies
- IGBT/MOSFET 栅极驱动器  
IGBT/MOSFET gate drive
- 交流和无刷直流电机驱动器  
AC and Brushless DC motor drives
- 可再生能源逆变器  
Renewable energy inverters
- 工业逆变器  
Industrial inverters

## 真值表 Truth table

LED	VCC-VEE " POSITIVE GOING" (TURN-ON)	VCC-VEE "NEGATIVE GOING" (TURN-OFF)	VO
OFF	0 ~30V	0 ~30V	LOW
ON	0 ~12.1V	0 ~11.1V	LOW
ON	12.1 ~13.5V	11.1 ~12.4V	TRANSITION
ON	13.5 ~30V	12.4 ~30V	HIGH

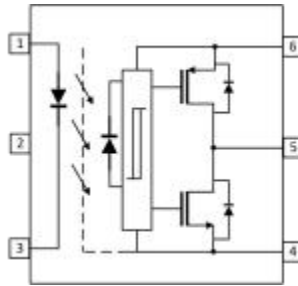
## 封装和原理图 Package and Schematic Diagram



SOP6-W



SOP6-P



### Pin Configuration

1. Anode
2. NC
3. Cathode
4. VSS
5. VO
6. VDD

## 产品型号命名规则 Order Code

# AT 343 - UN Y - W (V) (ZZ)

①      ②      ③      ④      ⑤      ⑥      ⑦

- ① 公司代码 Company Code (AT: 奥特 Aote)
- ② 产品系列 Product Series (343)
- ③ 框架类型 Lead Frame (Cu: 铜框架 Copper)
- ④ 树脂类型 Epoxy (H: 无卤 Halogen-free, L: 有卤/无铅 Halogen/Lead-free)
- ⑤ 封装形式 Package (S: SMD)
- ⑥ 器件工作温度范围 Device Operating Temperature Range (特殊范围需填或者空白 Special Range need to be filled in or left blank)
- ⑦ 内部补充代码 Internal Supplementary Code (数字或者空白 Number or None)

## 印字信息 Marking Information

- 印字中 “” 为奥特品牌 LOGO  
“” denotes LOGO
- 印字中 “Y” 代表年份：A(2018), B(2019), C(2020) ... ..  
“Y” denotes YEAR：A(2018), B(2019), C(2020) ... ..
- 印字中 “WW” 代表周号  
“WW” denotes Week’s number
- 印字中 “N” 代表星期几  
“N” denotes the day of the week
- 印字中的 “H” 代表无卤，而当产品有卤/无铅时，此处空白  
“H” denotes Halogen-free, when the product has halogen/lead-free, leave this blank.



**绝缘和安规信息 Insulation and Safety related specifications**

项目 Item	符号 Symbol	数值 Value	单位 Unit	备注 Note
爬电距离 Creepage Distance	L	≥7	mm	从输入端到输出端，沿本体最短距离路径 Measured from input terminals to output terminals, shortest distance path along body.
电气间隙 Clearance Distance	L	≥7	mm	从输入端到输出端，通过空气的最短距离 Measured from input terminals to output terminals, shortest distance through air.
绝缘距离 Insulation Thickness	DTI	≥0.4	mm	发射器和探测器之间的绝缘厚度 Insulation thickness between emitter and detector.
峰值隔离电压 Peak Isolation Voltage	$V_{IORM}$	1500	$V_{peak}$	DIN/EN/IEC EN60747-5-5.
瞬态隔离电压 Transient Isolation Voltage	$V_{IOTM}$	7000	$V_{peak}$	DIN/EN/IEC EN60747-5-5.
隔离电压 Isolation Voltage	$V_{ISO}$	5000	$V_{rms}$	For 1 min

**极限参数 Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ )**

参数 Parameter		符号 Symbol	额定值 Rating	单位 Unit
输入 Input	平均输入电流 Average Input Current	$I_{F(AVG)}$	25	mA
	峰值瞬态输入电流 (<1 $\mu\text{s}$ 脉冲宽度, 300 pps) Peak Transient Input Current (<1 $\mu\text{s}$ Pulse Width, 300 pps)	$I_{F(TRAN)}$	1.0	A
	反向电压 Reverse Voltage	$V_R$	5	V
输出 Output	高峰值输出电流 High Peak Output Current	$I_{OH(PEAK)}$	4	A
	低峰值输出电流 Low Peak Output Current	$I_{OL(PEAK)}$	4	A
	电源电压 Supply Voltage	$V_{CC}-V_{EE}$	0~35	V
	峰值输出电压 Peak Output Voltage	$V_{O(PECK)}$	-0.5 ~ $V_{CC}$	V
	降额因子(在 $T_A = 85^\circ\text{C}$ 以上) Rating Factor (Above $T_A = 85^\circ\text{C}$ )	$P_{DD}$	16.9	mW/ $^\circ\text{C}$
	输出功率 Output Power Consumption	$P_O$	700	mW
	总功耗 Total Power Consumption	$P_{tot}$	745	mW
降额因子 (在 $T_A = 85^\circ\text{C}$ 以上, 总功耗) Rating Factor (Above $T_A = 85^\circ\text{C}$ , Total Power Consumption)	$P_{ODD}$	15.3	mW/ $^\circ\text{C}$	
隔离电压 Isolation Voltage	$V_{iso}$	5000	$V_{rms}$	
工作温度 Operating Temperature	$T_{opr}$	-40 ~ +105	$^\circ\text{C}$	
储存温度 Storage Temperature	$T_{STG}$	-55 ~ +125	$^\circ\text{C}$	

参数 Parameter	符号 Symbol	额定值 Rating	单位 Unit
焊接温度 Soldering Temperature	$T_{sol}$	260	°C

### 推荐操作条件 Recommended Operating Conditions

参数 Parameter	符号 Symbol	最小值 Min	最大值 Max	单位 Unit
电源电压 Power Supply Voltage	$V_{CC}-V_{EE}$	15	30	V
开启电流 Input Current (ON)	$I_{F(ON)}$	7	16	mA
关断电压 Input Voltage (OFF)	$V_{F(OFF)}$	-3.6	0.8	V
工作温度 Operating Temperature	$T_A$	-40	+105	°C

### 产品特性参数 Electro-optical Characteristics ( $T_A = 25^\circ\text{C}$ )

除非另有说明，所有典型值均为  $T_A = 25^\circ\text{C}$ ， $V_{CC} - V_{EE} = 30\text{V}$ ， $V_{EE} = \text{Ground}$ ；所有最小和最大规格均是在推荐操作条件下 ( $T_A = -40^\circ\text{C} \sim 105^\circ\text{C}$ ， $I_{F(ON)} = 7\text{mA} \sim 16\text{mA}$ ， $V_{F(OFF)} = -3.6\text{V} \sim 0.8\text{V}$ ， $V_{EE} = \text{Ground}$ ， $V_{CC} = 15\text{V} \sim 30\text{V}$ )。

Unless otherwise noted, all typical values are at  $T_A = 25^\circ\text{C}$ ， $V_{CC} - V_{EE} = 30\text{V}$ ， $V_{EE} = \text{Ground}$ ；all minimum and maximum specifications are at recommended operating conditions ( $T_A = -40$  to  $105^\circ\text{C}$ ， $I_{F(ON)} = 7$  to  $16\text{mA}$ ， $V_{F(OFF)} = -3.6$  to  $0.8\text{V}$ ， $V_{EE} = \text{Ground}$ ， $V_{CC} = 15$  to  $30\text{V}$ )。

参数 Parameter	符号 Symbol	条件 Condition	最小 Min.	典型 Typ.	最大 Max.	单位 Unit
正向电压 Forward Voltage	$V_F$	$I_F = 10\text{mA}$	1.2	1.414	1.95	V
反向电压 Reverse Voltage	$B_{VR}$	$I_R = 100\mu\text{A}$	5	-	-	V
阈值电流从低到高 Threshold Input Current Low To High	$I_{FLH}$	$R_g = 10\Omega$ $C_g = 25\text{nF}$ ， $V_O > 5\text{V}$	-	2.8	4.0	mA
阈值电压从高到低 Threshold Input Voltage High To Low	$V_{FHL}$	$R_g = 10\Omega$ $C_g = 25\text{nF}$ ， $V_O > 5\text{V}$	0.8	-	-	V
输入正向电压的温度系数 Temperature Coefficient Of Input Forward Voltage	$\Delta V_F / \Delta T_A$	$I_F = 10\text{mA}$	-	-1.7	-	mV/°C
输入电容 Input Capacitance	$C_{IN}$	$f = 1\text{MHz}$ ， $V_F = 0\text{V}$	-	70	-	pF
输出 Output	高电平输出电流 High Level Output Current	$V_O = V_{CC} - 4\text{V}$	-1.0	2.8	-	A
		$V_{CC} - V_O \leq 15\text{V}$	-3.0	-	-	
	低电平输出电流 Low Level Output Current	$V_O = V_{EE} + 2.5\text{V}$	1.0	3.5	-	-
		$V_{EE} - V_O \leq 15\text{V}$	3	-	-	
高电平输出电压 High Level Output Voltage	$V_{OH}$	$I_O = -100\text{mA}$	$V_{CC} - 0.3$	$V_{CC} - 0.2$	-	V
		$I_O = 0\text{mA}$ $I_F = 10\text{mA}$	-	$V_{CC}$	-	

参数 Parameter	符号 Symbol	条件 Condition	最小 Min.	典型 Typ.	最大 Max.	单位 Unit
低电平输出电压 Low Level Output Voltage	$V_{OL}$	$I_O=100mA$	-	0.1	0.2	
高电平电源电流 High Level Power Supply Current	$I_{CCH}$	$R_g=10\Omega$ $C_g=25nF, I_f=10mA$	-	1.9	3	mA
低电平电源电流 Low Level Power Supply Current	$I_{CCL}$	$R_g=10\Omega$ $C_g=25nF, V_f=0V$	-	1.9	3	
高输出晶体管电阻 High Output Transistor Resistance	$R_{DS, OH}$	$I_{OH}=-3.0A$	-	14	2.5	$\Omega$
低输出晶体管电阻 Low Output Transistor Resistance	$R_{DS, OL}$	$I_{OL}=3.0A$	-	0.6	1.5	$\Omega$
逻辑低电平传输延迟 Propagation Delay Time to Low Output Level	$T_{PHL}$	$R_g=10\Omega$ $C_g=25nF$	50	88	200	ns
逻辑低电平传输延迟 Propagation Delay Time to High Output Level	$T_{PLH}$	$f=20kHz$ Duty Cycle=50%	50	66	200	ns
脉冲失真 Pulse Width Distortion	$P_{WD}$	$I_f=7mA$ to 16mA $V_{CC}=15V$ to 30V	-	22	70	ns
传播延迟差 Propagation Delay Difference Between Any Two Parts	$P_{DD}(PHL-t_{PLH})$	$R_g=10\Omega$ $C_g=25nF$	-100	-	-	ns
输出上升时间(10%~90%) Output Rise Time (10% To 90%)	$T_R$	$f=20kHz$ Duty Cycle=50%	-	43	-	ns
输出下降时间(90%~10%) Output Drop Time (90%~10%)	$T_F$	$I_f=7mA$ to 16mA $V_{CC}=15V$ to 30V	-	40	-	ns
低电压锁定阈值 Low-Voltage Lock Threshold	$V_{UVLO+}$	$V_O>5V$	12.1	12.8	-	V
	$V_{UVLO-}$	$I_f=10mA$	11.1	11.8	12.4	V
低电压锁定阈值迟滞 Low-Voltage Locking Threshold For Hysteresis	$U_{VLOHYS}$	-	-	1.0	-	V
输出高电平共模抑制 Output High Level Common Mode Transient Immunity	$ CM_H $	$T_A=25^\circ C$ $I_f=10mA$ $V_{CC}=30V$	35	50	-	kV/ $\mu s$
输出低电平共模抑制 Output Low Level Common Mode Transient Immunity	$ CM_L $	$V_{CM}=1500V$ with split resistors	35	50	-	kV/ $\mu s$
隔离电阻 Isolation Resistance	$R_{ISO}$	$V_{I-O}=500VDC$	$5*10^{12}$	-	-	$\Omega$
隔离电容 Isolation Capacitance	$C_{ISO}$	$F=1MHz$	-	0.6	-	pF

**典型光电特性曲线 Typical Electro-Optical Characteristics Curves**

Fig.1 High Output Rail Voltage vs Ambient Temperature

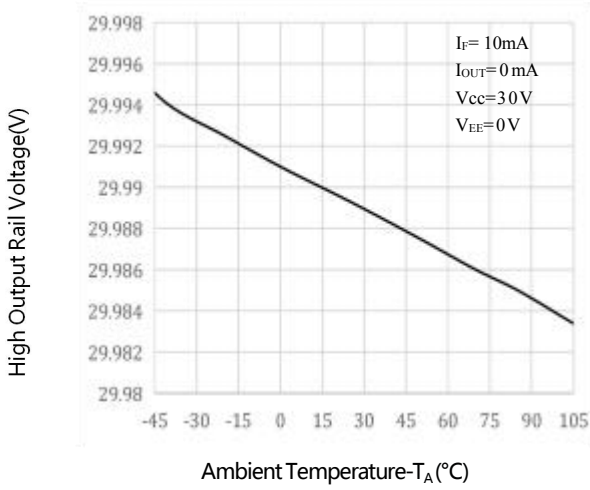


Fig. 2 High Level Output Voltage vs. Ambient Temperature

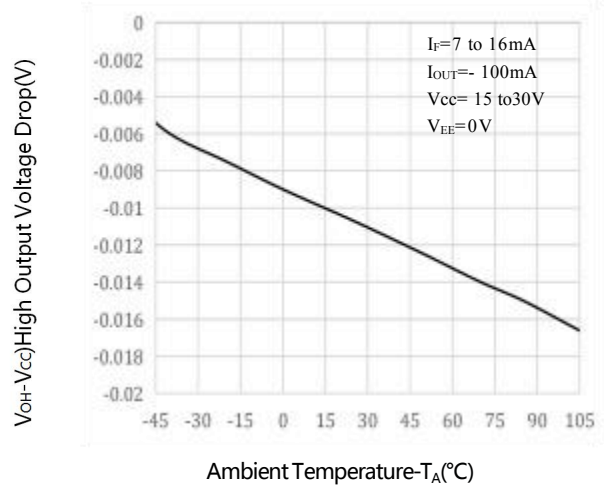


Fig. 3 Output Low Voltage vs Ambient Temperature

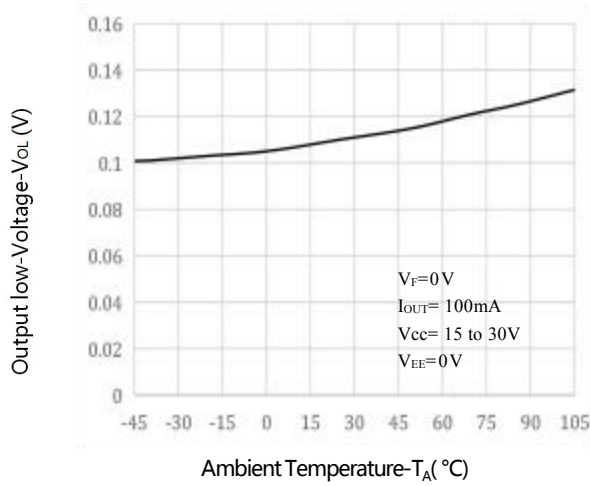


Fig 4. Power Supply Current vs. Ambient Temperature

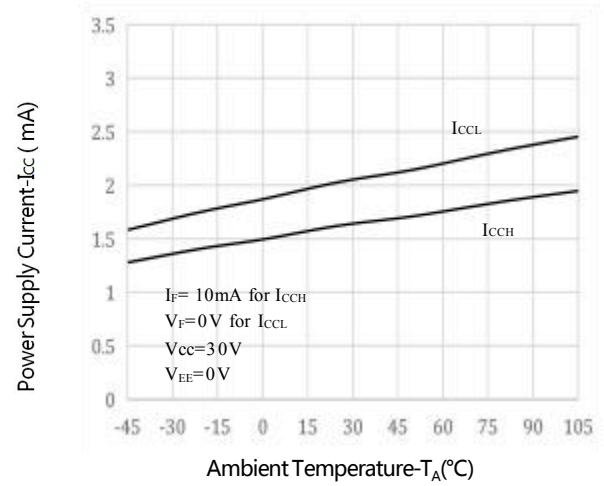


Fig 5. Power Supply Current vs. Supply Voltage

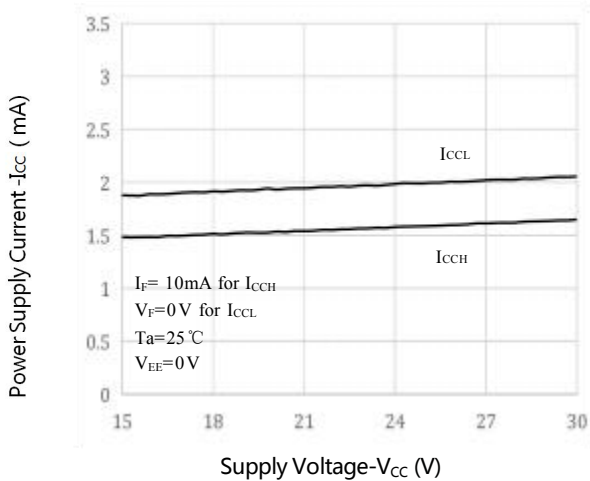


Fig 6. Output Voltage vs. Threshold Input Current Low to High

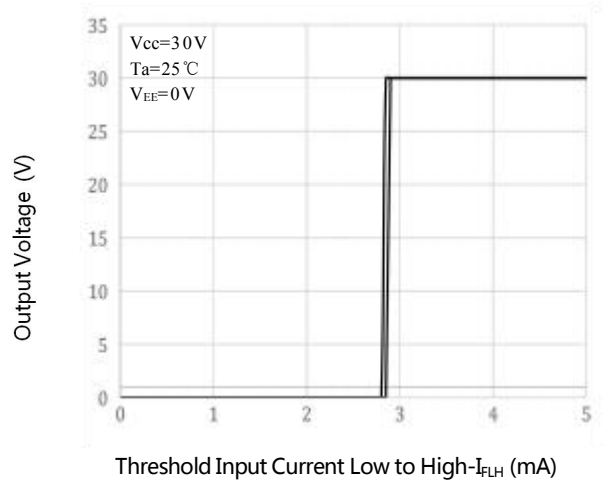


Fig7. Input Threshold Current vs Ambient Temperature

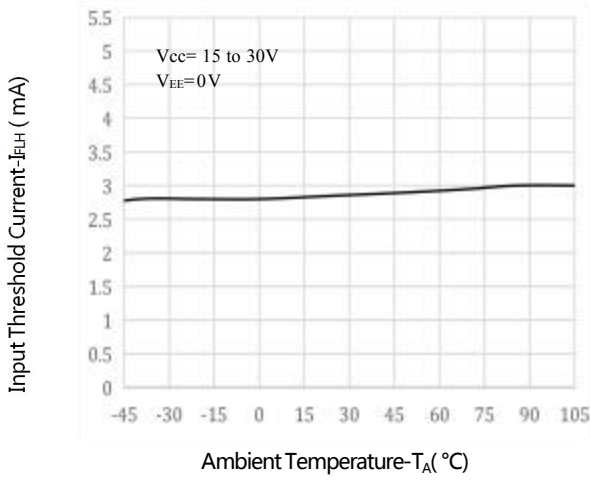


Fig8. Propagation Delay vs Power Supply Voltage

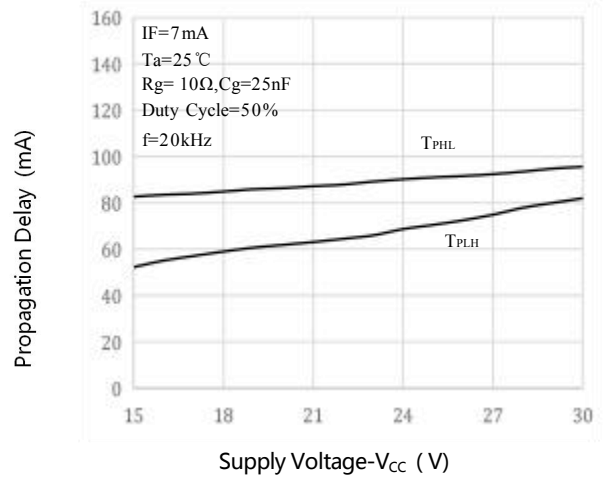


Fig 9. Propagation Delay vs. Forward LED Current

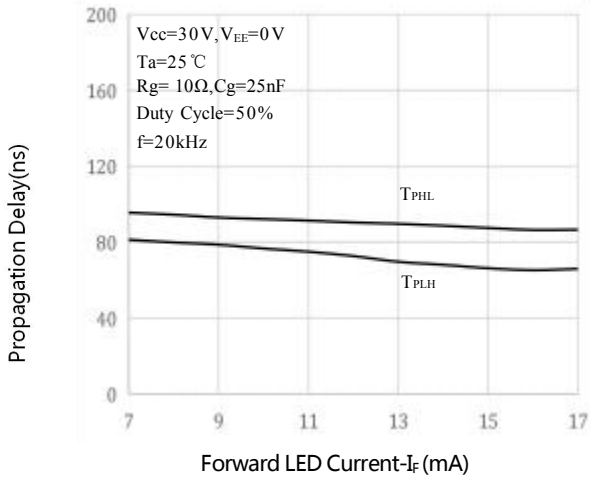


Fig 10, The Propagation Delay vs. Ambient Temperature

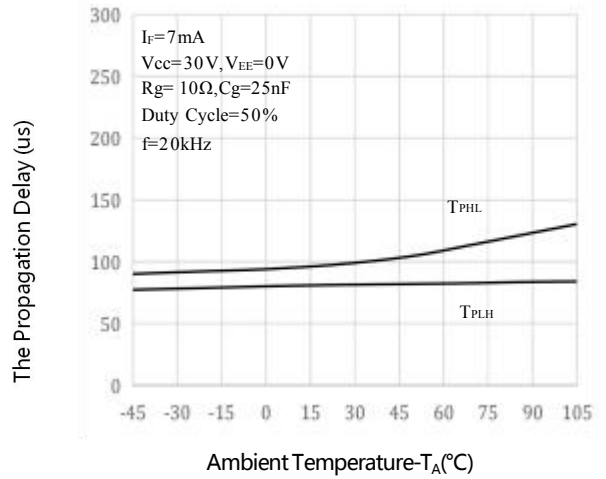
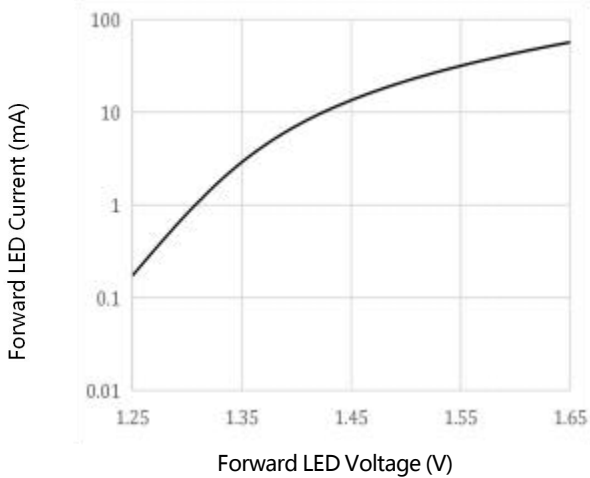


Fig11. Forward LED Current vs Forward LED Voltage





**测试电路 Test Circuits**

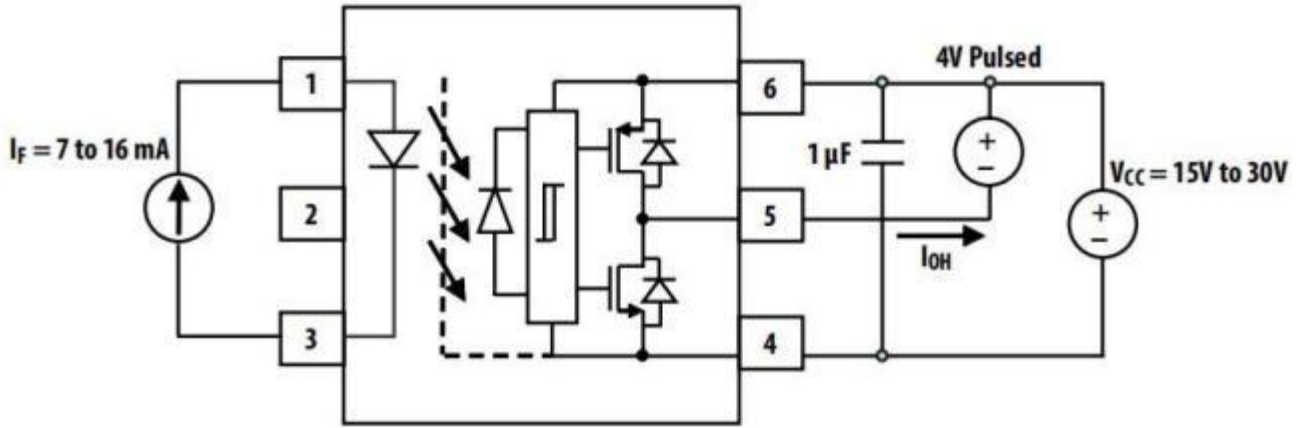


Figure.12  $I_{OH}$  Pulsed Test Circuit

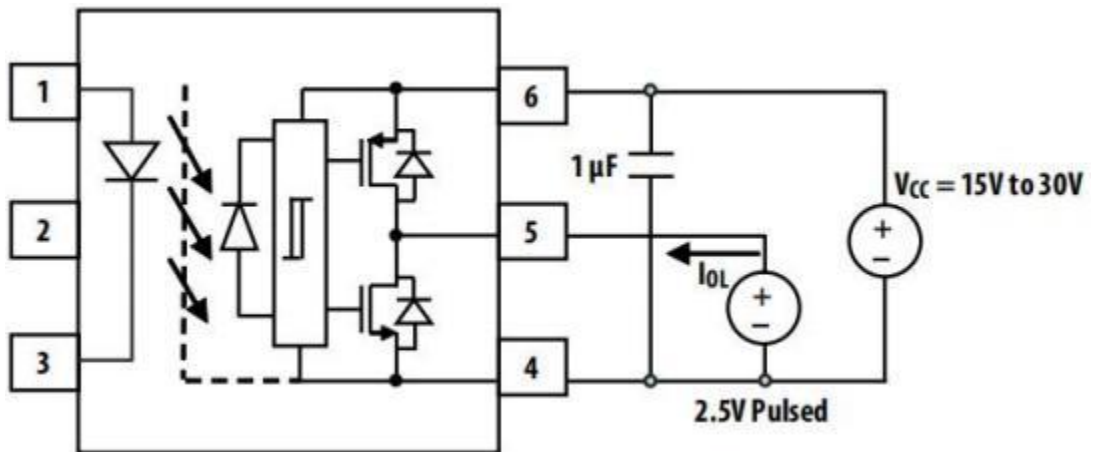


Figure.13  $I_{OL}$  Pulsed Test Circuit

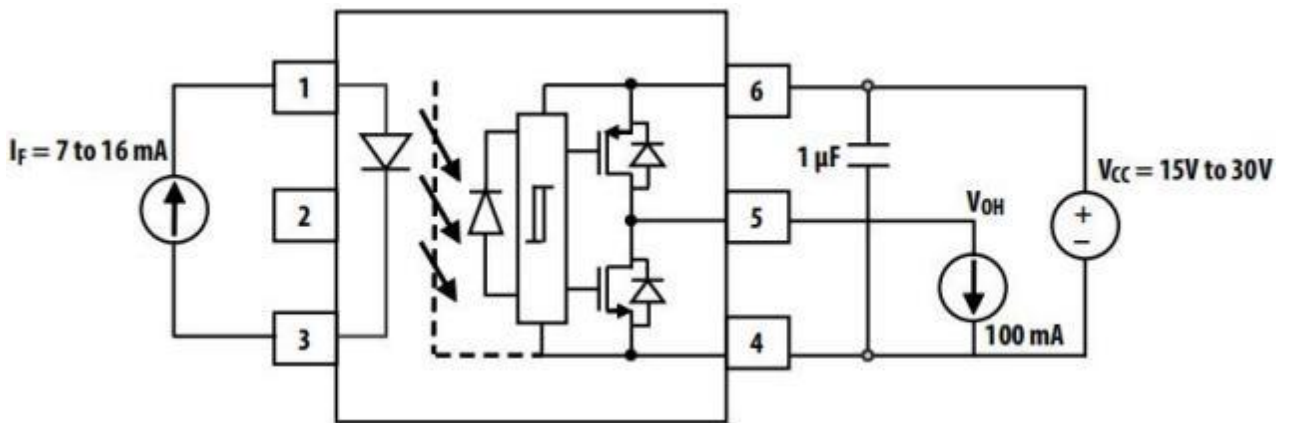


Figure.14  $V_{OH}$  Pulsed Test Circuit

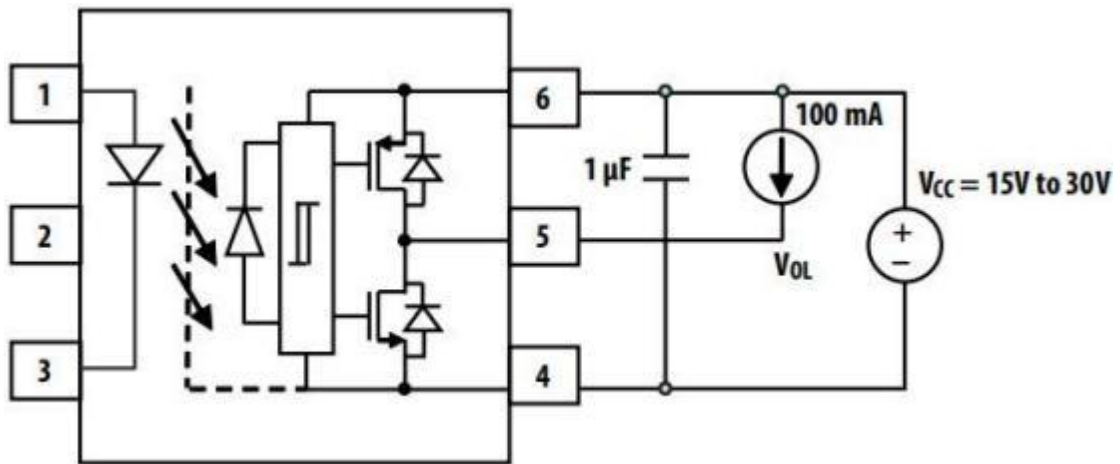


Figure.15  $V_{OL}$  Pulsed Test Circuit

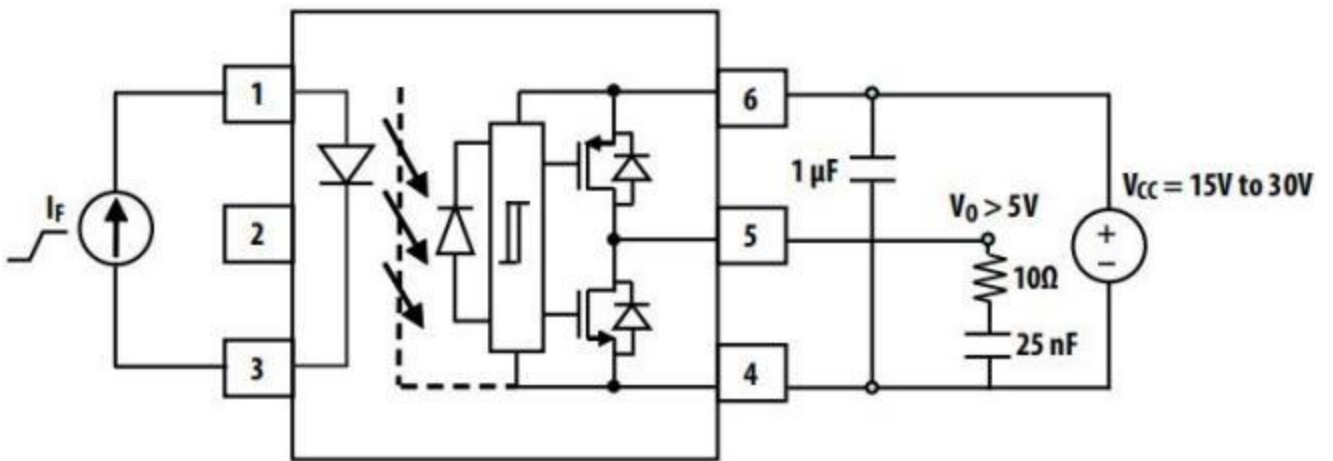


Figure.16  $I_{FLH}$  Test Circuit

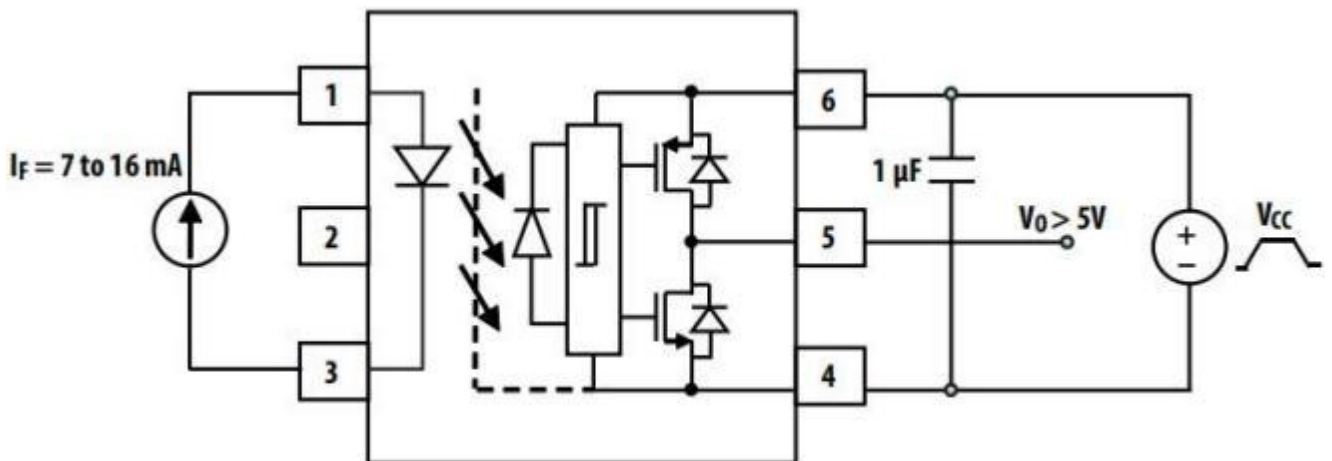


Figure.17 UVLO Test Circuit

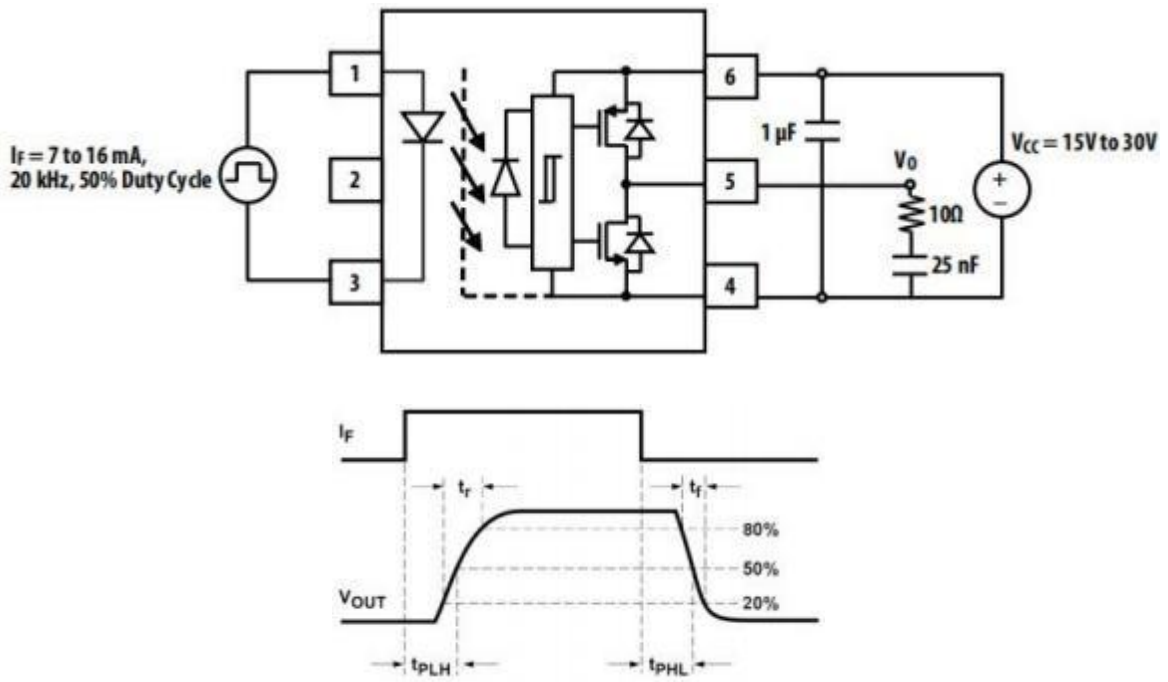


Figure.18  $T_{PHL}$ 、 $T_{PLH}$ 、 $T_R$ 、 $T_F$ 测试电路

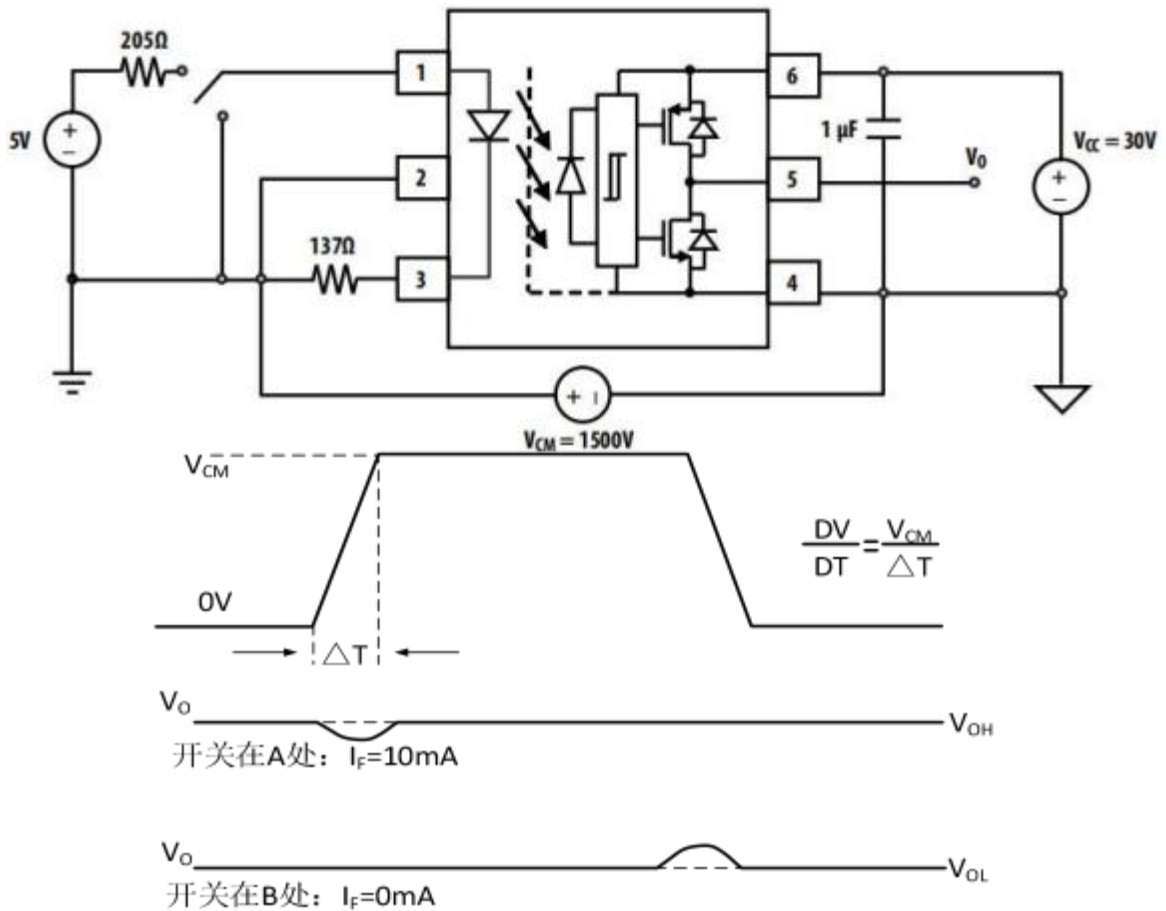
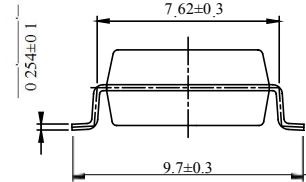
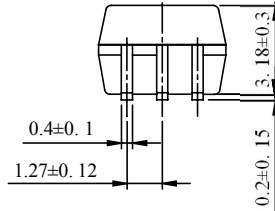
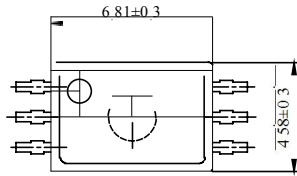


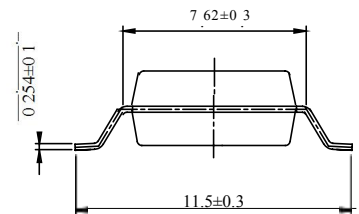
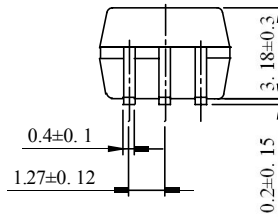
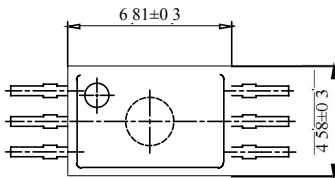
Figure.19 CMR 测试电路

**外形尺寸 Outline Dimensions**

**SOP6-P**

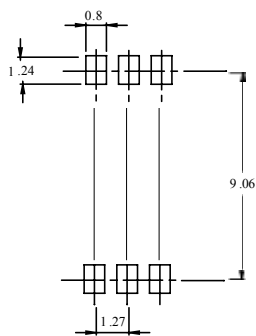


**SOP6-W**

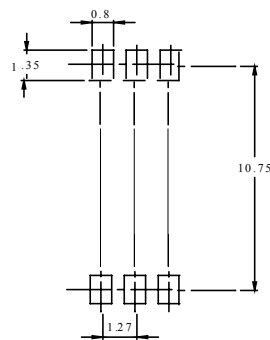


单位 Unit: mm

**建议焊盘布局 Recommended Pad Layout**



SOP6-P

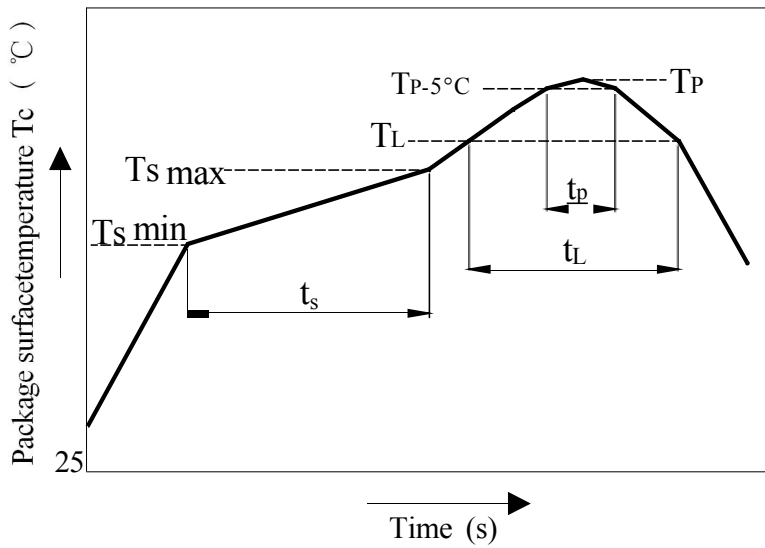


SOP6-W

单位 Unit: mm

注意：上图为产品正视图。

Note: The picture above is the front view of the product.

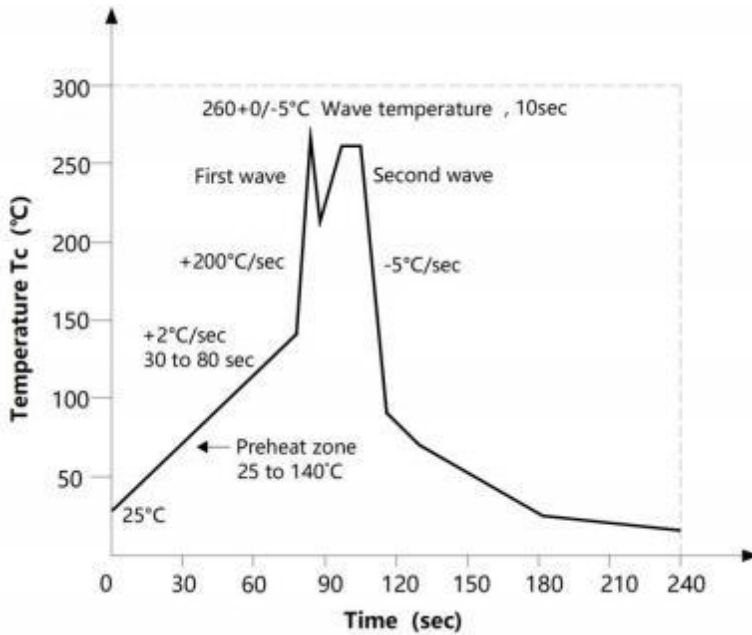
**回流焊温度曲线图 Solder Reflow Profile**


项目 Item	符号 Symbol	最小值 Min.	最大值 Max.	单位 Unit
预热温度 Preheat Temperature	$T_s$	150	200	$^{\circ}\text{C}$
预热时间 Preheat Time	$t_s$	60	120	s
升温速率 Ramp-Up Rate ( $T_L$ to $T_P$ )	-	-	3	$^{\circ}\text{C}/\text{s}$
液相线温度 Liquidus Temperature	$T_L$	217		$^{\circ}\text{C}$
时间高于 $T_L$ Time Above $T_L$	$t_L$	60	150	s
峰值温度 Peak Temperature	$T_P$	-	260	$^{\circ}\text{C}$
$T_C$ 在 $(T_P - 5)$ 和 $T_P$ 之间的时间 Time During Which $T_C$ Is Between $(T_P - 5)$ and $T_P$	$t_p$	-	30	s
降温速率 Ramp-down Rate ( $T_P$ to $T_L$ )	-	-	6	$^{\circ}\text{C}/\text{s}$

注意：建议在所示的温度和时间条件下进行回流焊，最多不能超过三次。

Note: Reflow soldering is recommended at the temperatures and times shown, no more than three times.

### 波峰焊温度曲线图 Wave Soldering Profile



### 手工烙铁焊接 Soldering with hand soldering iron

- A. 手工烙铁焊仅用于产品返修或样品测试；  
Hand soldering iron is only used for product rework or sample testing;
- B. 手工烙铁焊要求： 温度  $360^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ， 时间  $\leq 3\text{s}$ 。  
Manual soldering method Temperature:  $360^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , within 3s.

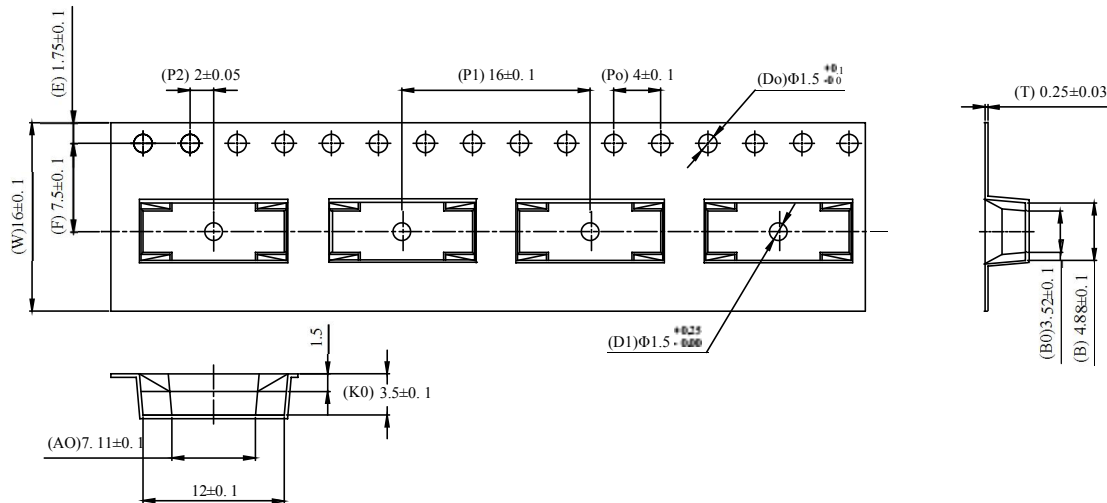
## 包装 Packing

### ■ 汇总表 Summary table

封装形式 Package Type	包装方式 Packing Form	盘数量 Quantity per Reel	盒数量 Quantity per Box	箱数量 Quantity per Carton	静电袋规格 Antistatic Bag Specification	盒规格 Box Specification	箱(双瓦楞)规格 Carton Specification	备注 Note
SOP6	卷盘 ( $\phi 330\text{mm}$ 蓝盘)	1000 只/盘	2 盘/盒	10 盒/箱	380*380mm	340*60*340 mm	620*360*365mm	首尾端空至少 200mm
SOP6	Reel ( $\phi 330\text{mm}$ Blue)	1k pcs/reel	2Reel/box	10box/ctn	380*380mm	340*60*340 mm	620*360*365mm	Leave at least 200mm of blank space at both ends

### ■ 编带包装 Tape & Reel

- 1) 每卷数量：1000 只。  
Qty/reel：1000 pcs.
- 2) 每箱数量：20000 只。  
Qty/ctn：20000 pcs.
- 3) 内包装：每盒 2 盘。  
Inner packing：2 reels/box.
- 4) 示意图 Schematic：



单位 Unit：mm

## 注意 Attention

- 奥特持续不断改进质量、可靠性、功能或设计，保留此文件更改的权利恕不另行通知。  
AOTE continuously improve quality, reliability, function or design. We reserve the right to change this document without notice.
- 请遵守产品规格书使用，奥特不对使用时不符合产品规格书条件而导致的质量问题负责。  
Please use in accordance with the product specification. AOTE is not responsible for the quality problems caused by non-compliance with the product specifications.
- 对于需要高可靠性或安全性的设备/装置需求，请联系我们的销售人员。  
For equipment/devices where high reliability or safety is required, please contact our sales representatives.
- 当需要用于任何“特定”应用时，请咨询我们的销售人员。  
When requiring a device for any “specific” application, please contact our sales in advice.
- 如对文件中表述的内容有疑问，欢迎联系我们。  
If you have any questions about the contents of the document, please contact us.